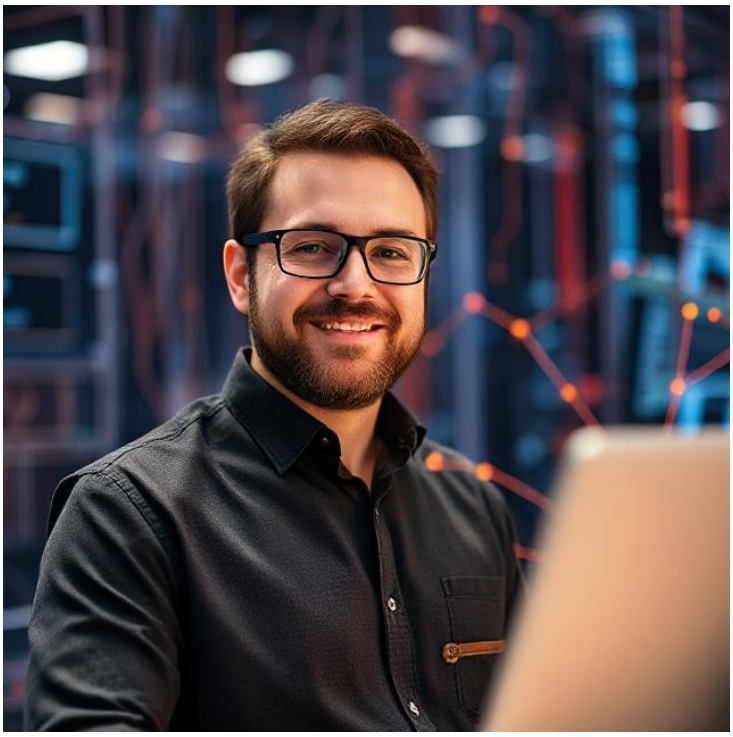
Todd Kassal of Illinois: How Quantum-Inspired Strategy Is Driving CK RubberTrack's Competitive Edge

Modern Manufacturing Meets Next-Generation Intelligence



Todd Kassal, Illinois

At CK RubberTrack in Illinois, manufacturing rubber tracks for heavy equipment may seem like a straightforward industrial process—one driven by machines, logistics, and output. But behind that production line is a quietly radical shift in how business decisions are made.

Todd Kassal, Project Manager at CK RubberTrack, is leading a new wave of operational intelligence by integrating **quantum-inspired technology** into the very core of the company's planning, production, and supply systems. While full-scale quantum computers remain in development, Kassal is using algorithms modeled on quantum principles—running on classical computers—to solve complex challenges with startling precision.

The result? A smarter, faster, and more adaptive business—one that's making big waves in an industry not known for rapid transformation.

From the Ground Up: Why Quantum-Inspired Innovation?

Most manufacturing challenges boil down to large-scale optimization: How do you balance production capacity, shifting demand, raw material costs, labor availability, and supply chain delays—all in real time?

Traditional tools struggle with this complexity. Quantum-inspired models, however, excel in situations where many variables interact simultaneously.

“These tools don’t just give you an answer,” Kassal explains. “They show you the best answer out of millions of possible scenarios, in seconds. That gives us speed, accuracy, and flexibility.”

Quantum principles like **superposition** and **entanglement** are reimagined as practical frameworks for analyzing uncertainty, exploring trade-offs, and continuously recalibrating decisions. For Kassal, that meant turning CK RubberTrack into **a manufacturing company that thinks like a physicist—but moves like a startup**.

Smarter Forecasting: Predicting the Unpredictable

CK RubberTrack operates in volatile markets—construction, agriculture, and specialty machinery. Fluctuations in weather, commodity prices, infrastructure funding, and even geopolitical shifts all impact order volume.

Kassal’s team implemented a quantum-inspired probabilistic forecasting system that doesn’t offer just one demand forecast. Instead, it delivers a range of possible demand scenarios, ranked by likelihood.

With that insight, CK RubberTrack:

- Slashed inventory waste by 30%
- Reduced emergency raw material orders
- Hit over 97% of delivery targets in a six-month window

“It used to be educated guessing,” Kassal says. “Now, we prepare for what’s most likely—and we’re ready for what’s not.”

Supply Chain Resilience in Real Time

Global supply chains are more fragile than ever. Rubber, steel, and composite materials often face bottlenecks or sudden price shifts. Kassal’s solution: a **real-time supply chain simulator** that models multiple sourcing paths simultaneously.

Using quantum-inspired optimization, the system can:

- Reroute shipments based on weather or port data
- Compare supplier options for cost and reliability
- Flag emerging risks in lead times and compliance

When Southeast Asia faced a shipping delay crisis in 2024, CK RubberTrack’s sourcing model found an alternate supply route through Turkey and Mexico—avoiding $200,000 in downtime.

“Without that kind of modeling, we would’ve been stuck reacting instead of moving ahead,” Kassal notes.

Leaner, Adaptive Manufacturing

Production scheduling used to be one of the most rigid systems in the company. A missed shipment or a late order could throw off an entire week. Kassal redesigned CK RubberTrack's scheduling platform using quantum logic principles—specifically, **quantum annealing**, a method that excels at finding the best path through complex systems.

The scheduling model now adjusts in real time based on:

- Machine availability and maintenance
- Labor shifts and absences
- Material flow and order urgency

That change brought:

- An 18% increase in production throughput
- A 25% drop in overtime costs
- A 42% improvement in on-time delivery consistency

"This isn't just software," Kassal says. "It's a living model that thinks alongside our team."

Empowering the Workforce with Intelligence

While much of Kassal's innovation happens in the backend systems, he's just as focused on the human side of the equation. His belief: technology should empower—not overwhelm.

Rather than long reports or complex dashboards, Kassal's systems surface **simple, actionable decisions** for staff:

- "You can save $3,200 in freight if you approve this schedule tweak—yes or no?"
- "Machine 4 needs maintenance in 8 hours—reschedule now or risk a delay?"
- "Supplier X now has better pricing for Track Model C—switch contracts?"

The approach has increased system engagement and built trust between floor teams and leadership.

"People aren't afraid of AI here," Kassal says. "They're using it like a power tool."

Accelerating Product Development with Simulated Chemistry

Now, Kassal's quantum-influenced playbook is expanding into product design. In partnership with researchers and software developers, he's introduced **quantum chemistry simulations** to model new rubber compounds virtually—predicting elasticity, durability, and temperature performance before any real-world testing.

This has shortened R&D cycles from six months to less than two, allowing faster experimentation with:

- Eco-friendly rubber alternatives

- Tracks with enhanced resistance to wear and weather
- Custom compounds for niche machinery

“We’re no longer guessing in the lab,” Kassal says. “We’re designing with insight.”

The Results Speak for Themselves

Since Kassal began embedding quantum-inspired models into CK RubberTrack’s operations, the gains have been broad and measurable:

- **Inventory waste reduced by** 30%
- **Production delays down by** 45%
- **Customer satisfaction scores at record highs**
- **Over $500K in annual savings** from optimization-driven decisions
- **R&D cycle time cut by more than half**

And perhaps most importantly, the company is now positioned as **an innovation leader in a legacy industry**.

A New Standard for Industrial Innovation

Todd Kassal’s work is more than a case study—it’s a blueprint. It shows that even in heavy industry, where tradition runs deep and margins are tight, advanced thinking can drive real change.

He’s not waiting for the future of computing. He’s taking what’s available now—smart algorithms, data modeling, and quantum-inspired logic—and using it to win today.

“We’re not trying to be futuristic,” Kassal says. “We’re just trying to be smart, fast, and ready. And quantum thinking helps us do that better than anyone else.”

From rubber tracks to real-time strategy, **CK RubberTrack is now a proving ground for what’s possible when physics meets business**—and a testament to how one project manager’s curiosity can reshape an entire company.